

witnessed by many observers prove the existence of elevations much more considerable than any upon the earth: as to Mercury, notwithstanding Schröter's deficiency as an artist, and his occasional mistakes of preconception, his observations are always too honest and faithful to be set wholly aside; and we are not sure that the uselessness of devoting time to this planet may not be found a mistake at some future day.

As to the physical condition of Mars, we venture to think that our author has dealt very fairly and judiciously with a subject of controversy, which might have become less pleasant but for the unassuming modesty of Schiaparelli and the liberal candour of Green, so honourable to each of them. We are not sure that it is always borne in mind, how much of the difference may have been due to the early return of the English observer from Madeira to a far inferior climate, previous to the development of the additional features which were subsequently perceived at Milan, and which may possibly, like their strange gemination, become more visible from prolonged solar influence. The less favourable position of the planet at the next opposition is much to be regretted; but Schiaparelli's experience has warned us that increase of distance may possibly be compensated by improvement in definition: to which we would add on the one hand the constantly verified adage of Sir W. Herschel, that "when an object is once discovered by a superior power, an inferior one will suffice to see it afterwards"; and on the other, the advantage which may be expected from the 18 inches of aperture with which the Italian Government are about to mark their appreciation of their astronomer's ability, and their willingness to enable him to meet the emergency. It will be matter of regret, if in this honourable contest no corresponding preparation should be made among ourselves; though it is difficult indeed to counteract the disadvantage of the English sky. It is not easy to forecast the result; but we think there are indications that possibly the supposed terrestrial analogy has been pushed quite far enough. As to the interesting question of the habitability of Mars by beings like ourselves, it deserves more attention than it perhaps has often received, that none of the supposed correspondence with our own constitution could be maintained excepting on the supposition of a higher internal temperature on the globe of Mars, or possibly a very different composition of atmosphere. We are not so much struck as the author with the progressive diminution of the measured diameter of Mars effected by the employment of modern instruments; at least Schröter's determination by the mode of projection in 1798 scarcely exceeds by 0".5 that adopted by Newcomb for 1850. Irradiation no doubt is a fact; and a very troublesome one; but we suspect that its effects have been sometimes over-estimated, or mixed up with those of diffraction; and possibly the subject might bear further investigation.

As to the internal heat of Jupiter, so interesting an inquiry ought not to have been left so long in abeyance. If it exists, it would hardly be less capable of detection than that of Arcturus; and the bolometer of Langley seems to offer a fair chance for the discovery. The satellite whose strange reappearance is so difficult of explanation was, it will be found, about to enter on transit instead of suffering occultation. It may be noted, *en passant*, that a telescope must have had a marvellous power of

indistinctness, that could show M. Flammarion the third satellite with a disc as large as that of Uranus (p. 409).

It seems a pity that the traditional misrepresentation of the ball of Saturn, at p. 358, as carrying a faint shadow on one side, should still be adhered to; and we may venture to suggest that there is a good deal of inequality in the execution of the diagrams in various parts of the book.

We are confident that the author will not misunderstand our remarks, or hesitate to accept our assurances that they are made in the most friendly spirit. If we are in error, he is fully able to hold his own; and he has our cordial wishes not only for his success on the present occasion, but for the extension of his labours, at no distant time, to a wider review of the glorious works of Nature.

THE ZOOLOGICAL RECORD

The Zoological Record for 1881. Being Vol. xviii. of the "Record of Zoological Literature." Edited by E. C. Rye. (London: John Van Voorst, 1882.)

IT is gratifying to be able to announce that the persevering efforts of the editor of the *Zoological Record* to publish the record of one year's work before the termination of the next year have been at last crowned with success; nor do we doubt but that this very desirable effort will be continued, and indeed become even less difficult with the advance of time, so that through the good will of the Recorders the date of publication will recede backwards from December to September or August in each year, enabling the worker to begin his autumn session with the volume in his hand. The facilities of intercourse are now so great with all parts of the world, that the Transactions and Proceedings really published in the month of December in any one year can be, nay are on our bookshelves in these British Isles, long ere the spring is on its wane, and no doubt long ere 1882 was out, some of the Recorders of this very volume had the record for that year well in hand. However great may be our expectations for the future we cordially welcome this present volume, and acknowledge that our thanks are due to both Editor and Recorders for what they have already done.

To those who have time for reflection and dare to look back over those eighteen years since Dr. Günther and his friends launched this work upon the world of science, the thought naturally arises of the vastness of the amount of work that is year after year being accomplished without apparently in any way leading to exhaustion. The Editor's own comments are naturally in the volume very few, but how full of meaning is the following: "This volume is 36 pages longer than its predecessor," that is, even the very enumeration of the zoological literature of 1881 requires about 800 closely printed pages; and again we read, "the number of new genera and sub-genera contained in the present volume is 1438"—a simply appalling number. The Insecta are credited with 543, and the Protozoa with 517 of these genera. An enthusiastic zoologist once contemplated the posting up to date of Agassiz's "Nomenclator Zoologicus," that was when the generic increase was some 400 to 500 a year; what would he

say or think now of these new births at the average of over 1000 a year. The "examination of this large number of new names, as regards prior occupation," the Editor states was necessarily superficial, we quite sympathise with him; before we read his footnote we rushed into the subject with the A's, but on turning over to page 2 we saw how matters stood and we gave the critical business up at once, and it was obvious at a glance that the greatest genus maker of the year was Ernest Haeckel.

The year 1881 showed a lull so far as the works on recent Mammalia were concerned—at least in comparison with 1880—but the flood of new extinct mammalian forms from North America shows no sign of abatement. In 1881 the lamented Balfour completed his excellent and masterlike treatise on Embryology. The account of the Mammalia in Messrs. Salvin and Godman's work on the Biology of Central America has been finished, and Peters and Doria have published an important work on the Mammals of New Guinea.

The contribution to Bird Literature has been considerable, and the year was marked by the appearance of two more volumes of the Catalogue of the Birds in the British Museum (vols. v. and vi.). Among the Reptiles, Batrachians, and Fishes, no work of any very special importance seems to have appeared. Dr. von Martens still records the Mollusca and Crustacea. The record of the former group extends to 108 pages, and of the latter to 38 pages; both are most painstakingly executed.

The literature of the Arachnida is more extensive than usual, and the year's work is marked by the appearance of several important contributions by the Recorder, Holmberg, Karsch, Keyserling, Koch, Pavesi, Simon, and Thorell, so that it is evident that the Arachnid treasures of the world are at last being worked. Among the Myriopods, Canton's Monograph of the Lombardy forms seems to call for notice.

The enormous group of Insecta is recorded by Mr. Kirby, with the exception of the Neuroptera and Orthoptera, which fall to the skilled hands of Mr. McLachlan.

The Vermes and Echinoderms are recorded by Prof. Jeffrey Bell; the Cœlenterata by A. G. Bourne and Sydney J. Hickson. It is remarkable that not a single new genus or species of any recent Octactiniae seems to have appeared in 1881, nor indeed any separate paper on the group. The Sponges and Protozoa have engaged the attention of Stuart O. Ridley; while nothing very striking seems to occur among the Sponge literature. Kent's Manual of Infusoria, and Haeckel's Prodomus of the Radiolaria mark the year; among the Protozoa, the latter work records 483 new genera and 2000 new species—an almost embarrassing number of pretty things.

We are truly glad that the importance of this Record is still practically witnessed to by the generous help rendered to the Zoological Record Association by the British Association for the Advancement of Science and by the Grant Committee of the Royal Society.

OUR BOOK SHELF

The Brewer, Distiller, and Wine Manufacturer. (London: J. and A. Churchill, 1883.)

THE little work before us is the first of a series of technological handbooks to be issued by the pub-

lishers, "each of which will be complete in itself, will appear in a handy form and at a low price." Practically they will be a re-issue of articles in Cooley's "Cyclopædia of Practical Receipts and Collateral Information in the Arts, Manufactures, Professions, and Trades," with a somewhat fuller treatment and with reference to the more recent developments which have taken place in industrial processes. As this, the first of these handbooks, treats of Alcohol and Alcoholimetry, Brewing and Beer, Cider, Liqueurs and Cordials, Distillation of Alcoholic Liquors, and lastly, Wine and Wine Making, necessarily much of the Encyclopædic form of treatment must remain, when such important industries are discussed in so small a compass.

Though we cannot endorse the statement of the publishers, that each handbook will be *complete* in itself, we are compelled to admit that the Editor has given a remarkably well condensed *précis* of what has been written on industrial fermentation processes.

The first chapter describes the sources of alcohol, its detection in liquids, and its estimation by volume and by weight: numerous tables are given for this purpose. In addition to the usual distillation process, the methods of Balling, Gröning, Brossard-Vidal, Silbermann, Geissler, and others are described; this part of the book must prove of much use to the technologist.

Brewing is described in fifty pages; this is sufficient to show how condensed the treatment of one of the largest industries in the kingdom must necessarily be. Brief though it be the Editor deserves the highest praise for the manner in which he has condensed the vast mass of facts now accumulated in this department of fermentation chemistry. In addition to the description of the English processes of malting, mashing, and fermentation, a brief account is given of the German Lager beer system now almost universal on the continents of Europe and North America. This is supplemented by a large number of elaborate analyses of English and "Lager" beers, showing the characteristic differences in the products of the two methods. Brief though this part of the handbook is, it will be found of interest to the general reader and of value to the practical brewer, who may not have hitherto given much attention to the scientific part of his manufacturing process.

In Chapter V. we have a full account of the mashing and fermentation processes adopted by the distiller and rectifier, including the methods followed by the latter to remove some of the fusel oils and to flavour "still" spirit so as to produce gins, whiskies, &c., of various taste and aroma. A useful feature in this part of the work will be found in the descriptions and drawings of the stills of Coffey, Siemens, Derosne, Laugier, Dorn, Pistorius, Pontifex and Wood, and others; this will be found of much interest to distillers, more especially in our colonies, where technical information is more difficult to obtain than in the old country.

The sixth and last chapter treats of Wine and its Manufacture.

After a brief description of the soils and manures best suited to the culture of the vine, we have an enumeration and description of some of the better known wines, such as Lafitte, Latour, Margaux, Haut Brion, Leoville, and other red wines of the Gironde, and of the white Graves, as Sauterne, Barsac, Château Yquem, Latour, &c.; of the Burgundies, Romanée Conti, Chambertin, Clos Vougeot, Clos St. George, and La Tache, and of some of the wines of the Champagne, Beaujolais and other vine districts of France.

A brief account is given of the so-called Hocks of the Rhine, and those of the valleys of the Moselle, Ahrn, and other rivers of Germany. In the description given of wine-making some use is made of the invaluable treatise by Messrs. Dupré and Thudichum ("On the Origin, Nature, and Varieties of Wine," Macmillan), a work